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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/803,528

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Neil M. Mackie

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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT

PAPER NUMBER

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/25/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/803,528

Applicant(s)

MACKIE ET AL.

Examiner

Maureen G. Arancibia

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 1-7, 15-21, 29-32 and 37-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-14, 22-28, 33-36 and 42-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 03/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. The Examiner notes with appreciation Applicant's detailed arguments submitted 8 November 2006, which have clarified the interrelationship between asserted Species A and B. Applicant's traversal of the election of species requirement, specifically the argument that Species A is actually broader than and encompasses the scope of Species B, is persuasive. Therefore, the election of species requirement made in the office action mailed 10 October 2006 is withdrawn.
2. Claims 8-14, 22-28, 33-36, and 42-46, drawn to previously elected Group II, will be examined on the merits.

Information Disclosure Statement

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

4. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **24** in Figure 3; **41** in Figure 10. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 8-14 and 33-36 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,270,266 to Hirano et al.

In regards to Claim 8, Hirano et al. teaches, in a system for exposing a wafer 3 to a treatment process in a treatment chamber 22 at a treatment pressure (about 40 mTorr; Column 6, Lines 47-49), said wafer including a frontside that is to be exposed to the treatment process and an opposing backside (Figure 1), said system including a support arrangement 4 for supporting the wafer in the treatment chamber such that the backside of the wafer is exposed to a heat transfer gas for thermally coupling the wafer to the support arrangement (Column 1, Line 64 - Column 2, Line 2), a method comprising: providing a fixed flow of the heat transfer gas from source 60 through regulator 61; routing heat transfer gas to the support arrangement so as to provide thermal coupling with the support arrangement, and having the heat transfer gas at a backside pressure (1-30 Torr; Column 7, Lines 24-39) that is greater than the treatment pressure such that a first portion of the heat transfer gas leaks between the support arrangement and the wafer into the treatment chamber (Column 8, Lines 28-34); sensing said backside pressure with sensor 68 to produce a pressure signal to controller 69 (Column 5, Lines 66-68); and controllably releasing a second portion of said fixed flow through mass flow controller 63, responsive to the pressure signal from sensor 68, as broadly recited in the claim, in that regulator 64 and mass flow controller 65 are controlled in response to the pressure signal from sensor 68 (Column 5, Line 66 - Column 6, Line 2), which in turn would affect the flow of gas in conduit 34 as it is released through mass flow controller 63.

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In regards to Claim 9, the backside pressure value is user selected. (Column 8, Lines 6-8)

In regards to Claim 10, the mass flow controller 63 may be considered to be a low pressure mass flow controller, as broadly recited in the claim. (The gas pressure in the conduit 34 is 0.7 kg/cm^2 ; Column 5, Lines 56-58)

In regards to Claim 11, the second portion of the gas flow is released through MFC 63 at the same time as the first portion of the gas flow leaks into the chamber; i.e. both portions of gas are supplied to the chamber during processing, as broadly recited in the claim. (Column 6, Line 42 - Column 7, Line 33)

In regards to Claim 12, controllably releasing the second portion of the fixed flow into the treatment chamber causes a relative constant dilution of the heat transfer gas proximate to the wafer with changes in a leak rate of the heat transfer gas between the support arrangement and the wafer, as broadly recited in the claim. In the method taught by Hirano et al., the dilution rate of the heat transfer gas proximate to the wafer would actually be zero, since the same gas is used as the heat transfer gas and the process gas. (Column 8, Lines 4-43) This meets the limitation that the dilution be relatively constant, as broadly recited in the claim.

In regards to Claim 13, the wafer 3 is located in a wafer plane within the treatment chamber (Figure 1), and controllably releasing includes introducing the second portion of the heat transfer gas through an opening 35 in the chamber wall (Figure 1) in a direction that is at least generally parallel to the wafer plane, as broadly recited in the claim.

In regards to Claim 14, introducing the second portion of the heat transfer gas includes introducing it through scattering holes 37, which causes the gas to flow into the treatment chamber at least approximately into the wafer plane, as broadly recited in the claim, where it participates in processing the wafer. (Figure 1)

Further in regards to Claim 33, the system of Hirano et al. can be used for treating a series of wafers, one after another, each of which would inherently have a different leakage rate, based on the specific shape, size, and flatness of each individual wafer. Introducing the second portion of the heat transfer gas comprises introducing the remainder of the fixed flow of gas that is not directed to the substrate support. (Figure 1) Therefore, introducing the second portion of the gas would approximate all of the fixed flow leaking between the support arrangement and the wafer, in that all of the gas is ultimately introduced to the chamber, as broadly recited in the claim. This would provide a fixed dilution of the heat transfer gas proximate to the frontside of the wafer irrespective of the leakage rate of the wafer being treated, since, as discussed above in regards to Claim 12, the same gas is used as the process gas and the heat transfer gas, and the dilution rate would therefore be zero.

In regards to Claim 34, see the discussion of Claim 13.

In regards to Claim 35, see the discussion of Claim 14.

In regards to Claim 36, the user-selected value for the backside pressure is electrically set by controller 69. (Column 5, Lines 66-68; Column 7, Lines 19-21)

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 22-28 and 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano et al. in view of U.S. Patent 5,679,405 to Thomas et al.**

The teachings of Hirano et al. were discussed above.

In regards to Claims 22 and 42, Hirano et al. does not expressly teach that the system includes two support arrangements for supporting and simultaneously exposing two wafers to the treatment process in the treatment chamber, with both wafers exposed to the same backside gas pressure.

Thomas et al. teaches, in a system including two support arrangements 4a, 4b for supporting two wafers (Figure 2), a method of simultaneously exposing two wafers, with both wafers being exposed to the same backside gas pressure due to sharing a common backside gas supply (gas delivery tube 28). (Column 4, Line 55 - Column 6, Line 11)

It would have been obvious to one of ordinary skill in the art to modify the method of Hirano et al. to be performed in a system including two support arrangements, and to simultaneously treat two wafers, with both wafers being exposed to the same backside pressure, as taught by Thomas et al. The motivation for doing so, as would have been recognized by one of ordinary skill in the art, would have been to increase process

throughput and efficiency by simultaneously and consistently processing more than one wafer at a time.

In regards to Claim 23, see the discussion of Claim 9 above.

In regards to Claims 24 and 25, it has been held that omission of a step and its function is obvious if the function of the step is not desired. Therefore, it would have been obvious to one of ordinary skill in the art, in desiring to use the method of Hirano et al. and Thomas et al. to process only a single wafer, such as at the beginning or end of a process run, to eliminate the step of supplying the backside gas to the second support arrangement. In the system taught by the combination of Hirano et al. and Thomas et al., any amount of the fixed flow not directed to the support arrangements would then be released into the treatment chamber.

Further in regards to Claim 25, the combination of Hirano et al. and Thomas et al. just discussed does not expressly teach introducing the remaining portion of the fixed flow into the chamber proximate to both wafer frontside when two wafers are being simultaneously processed.

Thomas et al. further teaches individual gas dispersion heads 12a, 12b for each of the support arrangements 14a, 14b. (Column 5, Lines 29-31)

It would have been obvious to one of ordinary skill in the art to modify the system taught by Hirano et al. and Thomas et al. to provide individual gas dispersion heads for each of the two support arrangements, as taught by Thomas et al. The motivation for doing so, as would have been recognized by one of ordinary skill in the art, would have been to provide for uniform and consistent processing of each of the wafers to be

processed. Furthermore, it has been held that the duplication of parts has no patentable significance unless a new and unexpected result is produced. *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) Such dispersion heads would allow for the introduction of the remaining portion of the fixed flow proximate to each of the respective support arrangements.

In regards to Claim 26, see the discussion of Claim 13 above.

In regards to Claim 27, see the discussion of Claim 14 above.

In regards to Claim 28, it is considered to be inherent in the method taught by the combination of Hirano et al. and Thomas et al. that the leak rates of the two wafers would be different, due to small differences between any two wafers in size, shape, and flatness, and that controllably releasing the remaining portion of the fixed flow of gas in response to the pressure signal would maintain the backside pressure to the selected value in this case, due to the control method taught by Hirano et al. and discussed above in the rejection of Claim 8.

In regards to Claim 43, see the discussion of Claim 25. While not expressly taught by the combination of Hirano et al. and Thomas et al., it is considered to be within the skill of one of ordinary skill in the art to divide the remaining portion of the fixed flow of gas equally amongst the two gas dispersion heads, in order to process the two wafers consistently and uniformly, with the same process specifications.

In regards to Claim 44, see the discussion of Claim 13 above.

In regards to Claim 45, see the discussion of Claim 14 above.


In regards to Claim 46, see the discussion of Claim 36 above.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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